CLAIMS

What is claimed is:

1. A method for calculating constrained paths for a transmission network, comprising:

a. respectively collecting attribute information of the link to which each node is connected and obtaining the information of the protect entity to which the link belongs;

b. flooding the collected attribute information to other nodes according to a protocol;

c. combining each node according to the information of the protection entities to which each link respectively belongs and forming the topology structure of each protection entity of whole network and related link attribute information; and

d. calculating constrained paths for the transmission network.

2. The method of claim 1, Step a further comprising the step of obtaining the usable bandwidth of link, the protection capability of link, the local interface IP address and the remote interface IP address of link.

3. The method of claim 2, collecting attribute information of the link to which each node is connected in Step a further comprising the step of interrogating the user configuration information of optical network devices through a specific software interface.

4. The method of claim 1, collecting attribute information of the link to which each node is connected in Step a further comprising the step of interrogating the user configuration information of optical network devices through a specific software interface.

5. The method of claim 1, wherein said protocol in Step b is the Open Shortest Path First (OSPF) protocol.

6. The method of claim 1, wherein flooding the collected attribute information to other nodes according to a protocol in Step b is through the packets of Link State Advertisement (LSA).

7. The method of claim 1, wherein Step d comprises:

d1. establishing PATHS for storing the information of the shortest path tree and TENT for storing the information of tentative nodes which have been attempted before finding the shorted path;

d2. putting the node doing the calculation on PATHS, and pre-loading TENT from the local adjacency database;

d3. examining links from the node to each of its neighbor nodes when putting the node on PATHS, if a neighbor node is already in PATHS, then ignoring this new way because it is longer; if a neighbor node is in TENT and the new path is shorter, replacing the old path with the new one; if the new path is the same length as the one in TENT, then the neighbor node having an equivalent path; if a neighbor node is not in TENT, then deleting links and nodes that do not satisfy the LSP constraint conditions and putting nodes respectively corresponding to links which satisfy the LSP constraint conditions on TENT;

d4. putting the nodes with least-cost from TENT to PATHS; and

d5. ending the routing calculating until TENT is empty or the destination node is already existed in PATHS.

8. The method of claim 7, further comprising the steps of:

d6. selecting the most appropriate path according to a policy if equal-cost paths exist;

d7. allocating a congruent time-slot to all nodes on this multiplex section protection (MSP) ring if the service passes a MSP ring; and

d8. if it is necessary to output protection paths simultaneously, outputting the protection paths based on the SDH/SONET protection topology according to the features of protection ring.

9. The method of claim 7, Step d3 further comprising:

if the protection of 1:1 type is required, calculating the protection path based on the MSP protection ring or MSP protection link, wherein the nodes which can be put on TENT may be the nodes on the MSP protection ring or MSP protection link; and

when passing through the protection ring, putting all the nodes that satisfy service constraint conditions and protection requirements on the protection ring on TENT.